

Abstract Submitted
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CHI Research on Pegasus-III¹ R. RAMAN, University of Washington, J.A. REUSCH, J.D. WEBERSKI, M.W. BONGARD, University of Wisconsin-Madison, F. EBRAHIMI, PPPL, R.J. FONCK, A.C. PALMER, University of Wisconsin-Madison, T.R. JARBOE, B.A. NELSON, University of Washington, M. ONO, PPPL, G.R. WINZ, University of Wisconsin-Madison — The spherical tokamak (ST) may require and the advanced tokamak would considerably benefit from the elimination of the central solenoid. PEGASUS-III is a ST non-solenoidal startup development station under design and fabrication dedicated to solving the startup problem. On PEGASUS-III, Transient and Sustained coaxial helicity injection (T- and S-CHI) will be explored, as well as possible synergies of CHI with local helicity injection and EBW heating and current drive. T-CHI has shown promising capability on the HIT-II and NSTX STs. However, in both these machines the vacuum vessel was electrically cut. For reactor applications a simpler biased electrode configuration is required in which the insulator is not part of the external vacuum vessel. To develop this capability PEGASUS-III will use a double biased electrode configuration, which would be a first of its kind for the reactor-relevant development of the CHI concept. The system is capable of generating plasma start-up currents at the levels that can be supported by the external poloidal field coils, which is estimated to be ~ 300 kA. The CHI design for PEGASUS-III will be described.

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